

Listing of the Claims

This listing of claims provides the current status of the claims in the application. No amendments have been made.

Claim 1 (canceled).

Claim 2 (previously presented): The method as claimed in claim 17, in which the spatialization of the virtual source is performed in an ambisonic context, further comprising:
calculating gains associated with ambisonic components in a spherical harmonics base.

Claim 3 (previously presented): The method as claimed in claim 17, in which the synthetic sound is intended to be reproduced in a holophonic, or binaural, or transaural context, on a plurality of reproduction channels, the method further comprising:
calculating a delay between reproduction channels , to define at the same time:
-a triggering instant of the sound characterizing the nature of the source, and
-the position of the source relative to a predetermined origin.

Claim 4 (previously presented): The method as claimed in claim 3, wherein the nature of the virtual source is parameterized at least by a temporal loudness variation, over a chosen duration and including a sound triggering instant.

Claim 5 (previously presented): The method as claimed in claim 4, wherein said variation comprises at least:
-an instrumental attack phase,
-a decay phase,
-a sustain phase, and
-a release phase.

Claim 6 (previously presented): The method as claimed in claim 3, wherein the spatialization of the virtual source is performed by a binaural synthesis based on a linear breakdown of

transfer functions, these transfer functions being expressed by a linear combination of terms dependent on the frequency of the sound and weighted by terms dependent on the direction of the sound.

Claim 7 (previously presented): The method as claimed in claim 6, wherein the direction is defined by at least one bias angle and, preferably, by a bias angle and an elevation angle.

Claim 8 (previously presented): The method as claimed in claim 6, wherein the position of the virtual source is parameterized at least by:

- a number of filterings, dependent on the acoustic frequency,
- a number of weighting gains each associated with a filtering, and
- a delay for each "left" and "right" channel.

Claim 9 (previously presented): The method as claimed in claim 17, wherein the nature of the virtual source is parameterized by at least one acoustic timbre, by associating the chosen relative loudnesses with harmonics of a frequency corresponding to a pitch of the sound.

Claims 10–16 (canceled).

Claim 17 (previously presented): A method for operating a device for generating a synthesized and spatialized acoustic signal comprising:

receiving by a receiver of the device a command for synthesizing and spatializing a sound associated to a virtual source being disposed at a given position relative to a predetermined origin, the sound not being received by the device and being defined at least by a frequency of its fundamental mode, a duration, and an intensity;

calculating by a computer of the device a gain based on the intensity of the sound and the given position of the virtual source relative to the origin; and outputting, by an output of the device, a synthetic sound signal representing the virtual acoustic source at the given position, said signal being defined at least by the gain calculated by the computer.

Claim 18 (previously presented): The method as claimed in claim 17, in which a plurality of virtual sources to be synthesized and spatialized are provided, wherein each source is assigned to a respective position.

Claim 19 (previously presented): A synthesis engine for synthesizing and spatializing an acoustic signal, comprising:

a receiver for receiving a command for synthesizing and spatializing a sound associated to a virtual source being disposed at a given position relative to a predetermined origin, the sound not being received by the device and being defined at least by a frequency of its fundamental mode, a duration, and an intensity;

a computer for calculating a gain based on the intensity of the sound and the given position of the virtual source relative to the origin; and

an output for outputting a synthetic sound signal representing the virtual acoustic source at the given position, said signal being defined at least by the gain calculated by the computer.

Claim 20 (previously presented): A synthesis engine according to claim 19, further comprising:

a man-machine interface implemented in a music editing context to place the virtual source in a chosen position relative to a predetermined origin, to define the command for synthesizing and spatializing.

Claim 21 (previously presented): A device for generating a synthesized and spatialized acoustic signal, comprising a processor, wherein the device also includes a working memory for storing processor readable instructions for implementing an acoustic synthesis and spatialization method for operating the device, said method comprising:

receiving a command for synthesizing and spatializing a sound associated to a virtual source being disposed at a given position relative to a predetermined origin,

the sound not being received by the device and being defined at least by a frequency of its fundamental mode, a duration, and an intensity;
calculating a gain based on the intensity of the sound and the given position of the virtual source relative to the origin; and
outputting a synthetic sound signal representing the virtual acoustic source at the given position, said signal being defined at least by the calculated gain.

Claim 22 (previously presented): A computer program product, stored in a computer usable memory of a central processing unit or a terminal, or on a computer usable removable medium specifically for cooperating with a drive of said central processing unit, comprising instructions for implementing a method for operating a device for generating a synthesized and spatialized acoustic signal, said method comprising:

receiving by reception means of the device a command for synthesizing and spatializing a sound associated to a virtual source being disposed at a given position relative to a predetermined origin, the sound not being received by the device and being defined at least by a frequency of its fundamental mode, a duration, and an intensity;
calculating a gain based on the intensity of the sound and the given position of the virtual source relative to the origin; and
outputting a synthetic sound signal representing the virtual acoustic source at the given position, said signal being defined at least by the gain calculated by the computing means.

Claim 23 (previously presented): A communication terminal, including a device for generating synthetic sounds comprising a processor and a working memory for storing processor readable instructions for implementing a method for operating a device for generating a synthesized and spatialized acoustic signal, said method comprising:

receiving a command for synthesizing and spatializing a sound associated to a virtual source being disposed at a given position relative to a predetermined origin, the sound not being received by the device and being defined at least by a frequency of its fundamental mode, a duration, and an intensity;

calculating a gain based on the intensity of the sound and the given position of the virtual source relative to the origin; and
outputting a synthetic sound signal representing the virtual acoustic source at the given position, said signal being defined at least by the gain.